GAO

United States General Accounting Office

Report to the Chairman, Committee on Government Operations
House of Representatives

June 1986

ATTACK WARNING

ADP Replacement for Warning and Assessment System Still Years Away

GAO/IMTEC-86-15

GAO

United States
General Accounting Office
Washington, D.C. 20548

Comptroller General
of the United States

B-209661

June 11, 1986

The Honorable Jack Brooks
Chairman, Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In your July 24, 1984, letter (see appendix), you requested that we assess the capabilities of the Tactical Warning/Attack Assessment (TW/AA) system and determine whether the Department of Defense's modernization efforts will correct existing deficiencies. This system is intended to provide our leaders with timely, unambiguous warning and assessment information in the event of a missile or bomber attack on the United States. On September 26, 1985, I testified before your Committee on our tentative audit findings on the TW/AA system. Our classified report (GAO/C-IMTEC-86-1) assesses the TW/AA system's current capabilities, Defense's efforts to modernize the system, and the system's ability to support the current national policy. In accordance with discussions with your office, we are issuing this unclassified version of our classified report.

In this report, we discuss Defense's efforts to modernize the automated systems that process the warning and assessment information provided to our nation's decision-makers. More specifically, we focus on the current and planned automatic data processing capabilities provided at the ballistic missile and air defense command centers.

We found the following:

- The Command Center Processing and Display System and the North American Aerospace Defense Command (NORAD) Computer System do not process and display TW/AA information identically.
- Software for the NORAD Computer System has a highly integrated and complex design, thereby making it difficult to implement changes.
- Defense's efforts to modernize the NORAD Computer System's hardware and software are behind schedule. On the basis of current Defense estimates, the system will be fully modernized between 1989 and 1992. Until then, the computer system, at critical points, will continue to rely on obsolete computer components that control the display of TW/AA information.
- Air defense computer systems at Region Operations Control Centers have inadequate processing capability for new weapons channels and

may have insufficient operator display consoles to control interceptor aircraft responding to an attack.

Defense's modernization efforts, if successful, should correct these deficiencies, except for those at the Region Operations Control Centers.

Objectives, Scope, and Methodology

To accomplish our review of command centers' automatic data processing capabilities, we collected detailed operational and planning data at the headquarters of the North American Aerospace Defense Command/Air Force Space Command, Colorado Springs, Colorado, and the Air Force Tactical Air Command, Langley Air Force Base, Hampton, Virginia. We obtained modernization information from the Air Force Systems Command's Electronic Systems Division. In addition, from July 1985 to December 1985, we did audit work at the 23rd NORAD region, Tyndall Air Force Base, Florida; the 26th NORAD region, March Air Force Base, California; and the 326th Air Division in Hawaii. We observed operations at the National Military Command Center at the Pentagon; the Alternate National Military Command Center, Fort Ritchie, Maryland; the Strategic Air Command Command Post, Offutt Air Force Base, Nebraska; and the NORAD Cheyenne Mountain Complex near Colorado Springs, Colorado.

We discussed our facts and issues with senior Defense officials and have incorporated their comments where appropriate. However, in accordance with your wishes, we did not obtain the views of these officials on our conclusions and recommendations. Nor did we request official agency comments on a draft of this report. Except as noted above, we performed our review in accordance with generally accepted government auditing standards.

Responsibilities of Primary Command Centers and Region Operations Control Centers

The processing and display computer systems at the primary command centers provide ballistic missile warning and assessment information to our decision-makers. The primary command centers are the National Military Command Center, Alternate National Military Command Center, Strategic Air Command Command Post, and NORAD's Cheyenne Mountain Complex. The air defense Region Operations Control Centers have computer systems that process data from air defense radar systems, forward warning information about unknown aircraft to the Cheyenne Mountain Complex, and control the interception of enemy aircraft for assessment and defensive actions.

TW/AA data processing is performed by the (1) Command Center Processing and Display System at the Strategic Air Command and at the Alternate and National Military Command Centers, (2) the NORAD Computer System at the Cheyenne Mountain Complex, and (3) computer systems located at each Region Operations Control Center.

Different Processing and Display

The NORAD Computer System and the Command Center Processing and Display System computers at the three other primary command centers do not process and display data identically. As a result, a situation could occur where the assessments of a nuclear attack would differ between the two systems, which could possibly cause some momentary confusion concerning the magnitude of an attack. Details concerning processing and display problems are contained in our classified report.

Complex NORAD Computer System Software Is Difficult to Modify

Software for the NORAD Computer System is difficult to modify. A 1982 Air Force study entitled Cheyenne Mountain Complex Automatic Data Processing System Architecture pointed out that the ballistic missile warning mission, air defense mission, battle staff support function, and system control function were supported by integrated software executed on the same processor. The study stated that this results in communication and integration complexities that

"complicate the operation, maintenance, and modification of the current system.... The mission functions have become linked together in common hardware and software elements. The aggregation of functions constrains the operational performance and precludes cost-effective software development to accommodate new requirements."

The data processing problems pointed out in this study continue to affect mission support. According to the Air Force Space Command, software changes are becoming more expensive and more labor-intensive than in the past. The 1984 Statement of Operational Need for the GRANITE SENTRY Cheyenne Mountain Complex replacement program states:

"It currently takes 18 to 24 months to implement many software changes.... ...the software, constrained by the present architecture and hardware, is difficult to maintain and will not meet future processing and growth needs."

It further states:

"The complex interrelationships between the mission and support areas in the current system design unnecessarily increase the risks during software change/integration."

These integration complexities will continue to exist until final system replacement, scheduled between 1989 and 1992. (See page 5 for details on the GRANITE SENTRY program.)

NORAD Computer Modernizations Are Behind Schedule

Since the late 1970s, we and various congressional committees have pointed out problems with the NORAD Computer System. For example, in our 1978 report,[1] we recommended that the system be replaced with state-of-the-art computer hardware and software systems. In 1981, the Air Force indicated that planning for replacement was complete and that the initial operational capability for the replacement system would be achieved in March 1987. The Committee's 1982 report, NORAD Computer Systems Are Dangerously Obsolete, specifically recommended that the Secretary of Defense take immediate steps to ensure that NORAD acquire the most modern computer technology available to meet its mission requirements. In 1982, Defense reported to the House Armed Services Committee[2] that the NORAD Computer System would be replaced by fiscal year 1987. Defense now indicates, however, that this replacement will occur between 1989 and 1992. As discussed below, until then, NORAD will have to rely on obsolete computer system components to carry out its mission.

NORAD Computer System's Components Are Obsolete

The Defense Department's Federal Acquisition Regulations Supplement indicates that a system can be considered obsolete when maintenance service or parts become unavailable or are no longer provided by the original equipment manufacturers. Some components of the NORAD system readily meet these criteria.

The NORAD Computer System relies on obsolete NOVA computers, which are located at key points in this system. These computers control communications between the NORAD Computer System's core processor and the graphic displays, which provide critical tactical warning data to

[1]NORAD's Information Processing Improvement Program—Will It Enhance Mission Capability? (LCD-78-117, September 21, 1978).

[2]Modernization of the WWMCCS Information System (WIS), which was issued in response to House Report Number 96-916 and 97-333, dated July 31, 1982.

decision-makers located throughout the Cheyenne Mountain Complex. The General Services Administration[3] has identified the NOVA computers as obsolete. In addition, the manufacturer no longer provides maintenance service or spare parts for these computers. Consequently, NORAD must provide maintenance service by manufacturing its own spare parts and by relying on parts from retired NOVAs. In a 1980 report,[4] we noted that obsolete equipment tends to break down more frequently, and requires longer scheduled and unscheduled maintenance periods. The 1984 Air Force GRANITE SENTRY document acknowledges that the NOVA computers are becoming significantly more expensive to maintain and could lead to unacceptable downtime while the NORAD system is being repaired. Until these components are replaced, currently scheduled between 1989 and 1992, NORAD will depend upon obsolete equipment to support its vital mission.

Modernization Efforts for the Command Centers' System

Three major programs will replace or upgrade computer systems at the primary command centers and at Region Operations Control Centers from 1989 to 1992. These are the Command Center Processing and Display System Replacement program, the GRANITE SENTRY program, and the Atmospheric Tactical Warning Connectivity program.

The Command Center Processing and Display System Replacement program will provide a standard system for the four primary command centers. This replacement program will provide for the development of standardized ballistic missile TW/AA computer system processing at the four primary command centers, with major processing systems located at the Cheyenne Mountain Complex and the Strategic Air Command. The replacement will include a modular design to permit future upgrades without requiring complete or major system redesign. Although the replacement was originally scheduled to be operational by 1987, both NORAD and the primary command centers have had to implement interim upgrades to provide additional resources to support expanding TW/AA data processing work loads. The estimated completion date has been changed to the 1989-90 time period.

Under its GRANITE SENTRY program, NORAD should complete the replacement of its computer systems in 1991 and 1992. This program is

[3]The General Services Administration's Federal Information Resources Management Regulation Bulletin 5, dated December 4, 1985.

[4]Continued Use of Costly Outmoded Computers in Federal Agencies Can Be Avoided (AFMD-81-9, December 15, 1980).

intended to provide a new NORAD command post processing and display system, a separate air defense processor, and displays for the Cheyenne Mountain Complex. GRANITE SENTRY would provide for the replacement of the obsolete NOVA computers and for the separation of computer systems by mission area.

The primary upgrade for the Region Operations Control Centers—the Atmospheric Tactical Warning Connectivity program—is intended to provide the increased data processing capability needed to integrate data from new air defense radars around the perimeter of North America and from the Airborne Warning and Control System. Plans call for completion of this program by 1992.

Processing Limitations Affect Mission Performance at the Region Operations Control Centers

The Region Operations Control Centers' ability to respond to an attack and perform some peacetime exercise programs may be restricted because of a limited number of weapons guidance channels and an insufficient number of operator display consoles. The weapon guidance channels are used to guide interceptor aircraft to potential threat aircraft. According to Air Force officials, the centers do not have enough guidance channels to conduct training exercises, and the number of channels may be insufficient in an attack. The Northeast regional center has requested additional weapons guidance channels; however, plans to add the needed channels cannot be implemented now because processor storage in the regional centers' computer system is limited.

All the regional centers we visited need additional operator display consoles. These consoles provide an operator a picture of the total air defense situation. The 1984 Tactical Air Command's Joint Surveillance System Operational Test and Evaluation report,[5] which includes an assessment of the regional centers, also identifies the need for additional consoles. The report noted that this console limitation restricts the regional centers' ability to supervise and manage the air defense forces, conduct region-wide exercises, simulate realistic practice exercises, and provide training control for interceptors. Currently there are no approved plans to obtain additional display consoles and processor storage.

[5]Tactical Air Command's Joint Surveillance System Qualification Operational Test and Evaluation, March 1984.

Conclusion

Although the TW/AA command center processing systems have been upgraded and improved, we remain concerned about Defense's operating key TW/AA processing systems with obsolete components. We believe that the Region Operations Control Centers' processing limitations and a lack of approved plans to improve the situation jeopardize the centers' ability to reliably support their peacetime and wartime missions.

Recommendations

We recommend that the Secretary of Defense take the following steps:

- Replace as quickly as practicable all obsolete components of the North American Aerospace Defense Command's Cheyenne Mountain Complex Computer System and require that current replacement schedules be maintained.
- Expand processor storage and operator display console capabilities for the air defense Region Operations Control Centers' computer systems to support peacetime and wartime mission needs.

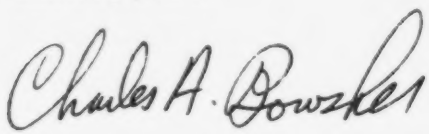
These recommendations should be considered as near-term automatic data processing improvements to be made in the context of a TW/AA system modernization plan. Such a plan should be based on the specific operational requirements needed to carry out the national policy. It should include schedules, costs, and priorities for the development of a technically feasible and affordable system to meet the requirements of the national policy.

As discussed in our classified report, resolution of TW/AA system problems has been complicated by two factors: (1) the lack of an approved, thorough, and consistent statement of system capabilities needed to support the national policy of flexible response and (2) the absence of a comprehensive and complete plan for developing a system with these needed capabilities. In that report, we are recommending that Defense correct automatic data processing deficiencies at the command centers, evaluate the costs and benefits of alternative TW/AA investment strategies, develop a comprehensive and complete system plan, and notify the Congress of its plans.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time,

we will send copies to the Secretary of Defense and to the Director, Office of Management and Budget. Copies will also be made available to other interested parties upon request.

Sincerely yours,



Charles A. Bowsher
Comptroller General
of the United States

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Request Letter

NINETY-EIGHTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON GOVERNMENT OPERATIONS

2157 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, D.C. 20515

July 24, 1984

The Honorable Charles A. Bowsher
Comptroller General of the United States
Washington, D.C. 20548

Dear General:

Over the years, I've become increasingly concerned over the reliability of the computer and communications networks supporting our nation's Tactical Warning/Attack Assessment (TW/AA) system. The Committee has found that many of the critical elements of this system are at best marginally effective and in some cases seriously outdated and obsolete. While DOD has given the Committee assurances that the various modernization projects initiated over the last three years will correct these problems, I remain skeptical whether these efforts will result in a reliable state-of-the-art system. In this regard, the Department has experienced serious difficulties in taking advantage of modern computer and communications technology which is readily available from industry. This has been particularly true in those systems which gather, process and distribute information relating to ballistic missle warning and attack assessment. Problems in this area range from equipment and software failures resulting in false alerts of enemy attack, to the inability of the system to accurately detect and identify real threats.

Since this system is so critical to our nation's defense, I request that you immediately undertake a major review of DOD's efforts to modernize the computer, communications and information networks supporting TW/AA. As part of this review GAO should make (1) a technical assessment of the system's current capabilities, including its strengths and weaknesses, (2) a determination of whether the various modernization efforts will in fact correct existing deficiencies, and (3) recommendations on how DOD may better take advantage of modern technology in support of this critical mission. Since GAO's ADP and telecommunications expertise has now been consolidated in the IMTEC Division, I request that this group be assigned this review. I would appreciate receiving a written report of your findings, conclusions, and recommendations no later than September 1, 1985. Your continued support is greatly appreciated.

With best wishes, I am

Sincerely,

JACK BROOKS
Chairman

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